more readily acted upon by aerobic organisms. It is evident, from the description given and comments made by Mr. Dibdin, that he pins his faith to the aerobic method; though, from the evidence given, it seems probable that the author may in time come to modify his present position.

One of the most interesting sections in the book is that devoted to the description of the various methods by means of which Mr. Dibdin has obtained his results. The description of the micro-filter alone would well repay a perusal of the whole book; the ingenuity exhibited in this simple piece of apparatus marking out Mr. Dibdin as, if not a born, a well-trained experimenter. The methods of determining the amount of nitrates and of oxygen absorbed and dissolved, will appear to the ordinary reader to be considerably less complex and complicated than those usually recommended. This is due, in part, to the fact that some of the processes have undoubtedly been simplified; but it is due still more to the fact that, having worked so much with them, Mr. Dibdin is able to give clear and lucid descriptions of the essential parts of the process without overburdening them with details which, from a practical point of view, are of little importance.

A full description is given of the history of the purification of the Thames from the time that the reaches between Westminster and Waterloo Bridges had their banks covered with accumulations of offensive mud, deposited from water little better than sewage, to the time that fish made their way up the ditches which contained the effluent from the biological filter-tanks at Barking. The whole story is one of engineering, chemistry and bacteriology, set out in plain matter-of-fact form; but Hercules' task of cleansing the Augean stables was mere child's play to the problem that had to be attacked and solved between the years 1855 and 1895. The concluding chapters of the book are taken up with descriptions of some of the methods of ventilation and deodorisation of sewers; with a short account of filtration of potable water; a description of the character of the London water supply; with sections on the action of soft water upon lead; on the application of the biological process to the purification of waste water from private properties, asylums, schools, &c.; and, finally, one on the systematic examination of potable water. Appendices on methods of determining the amount of oxygen dissolved in water, and a detailed report to the London County Council on the experiments on the filtration of sewage effluent during the years 1892-95 complete the work.

Although the reader may not, and probably will not, always agree with Mr. Dibdin, the work on which the conclusions are based appears, in most cases, to be above criticism. The experiments are set out in such form that each one affords ample material on which to base an opinion; the statistics, observations and descriptions are of such a character that not only will they assist in this, but they also give evidence that Mr. Dibdin has made the subject thoroughly his own. His arguments are backed by facts and figures, all the results of careful investigation and of laborious work. The result is that we have a book of far more than ordinary interest, quite apart from the fact that the author has to deal with such interesting matter—a book that may with confidence be recommended to any who take an interest, however slight, in the subject of the bacterial treatment of sewage.

G. S. W.

---

## *SCIENCE AND ART OF BUILDING.*

*Modern Architecture.* A book for architects and the public. By H. H. Statham, F.R.I.B.A., Editor of the *Builder*, &c. 8vo, pp. 275. (London: Chapman and Hall, 1897.)

*Complete Perspective Course.* Britannia Series. By J. Humphrey Spanton. 8vo, pp. 282. (London: Macmillan and Co., 1898.)

*Notes on Carpentry and Joinery.* By Thomas Jay Evans. 8vo, pp. 396. (London: Chapman and Hall, 1897.)

THE first of these three books suffers from the too prevalent custom of assigning a title to a book that conveys the idea of a greater scope and value than the contents can candidly be said to justify. In the preface the author fairly states the origin of the bulk of the book in a course of lectures delivered to a class of architectural students, not, it is true, previously published, but which, we venture to think, should have appeared in their primary form, possessing all the interest and actuality that such deliverances would have had; without being dressed up with a title that leads the reader to expect a more serious treatment of such an extensive subject as modern architecture.

There are undoubtedly many cultivated people to whom a clear account of modern architecture would be of the greatest interest, inquirers who from time to time, lighting upon some fine modern building, have been puzzled at the qualities which they have felt it to possess, but which are not, at the same time, those of ancient buildings with which the antiquarian leanings of most English people of taste might have made them familiar. Thus made dimly conscious of a new spirit in architecture, they have felt a novel ignorance of the aims and ideals of a modern art, of which very likely they had not been prepared to admit the existence.

A layman is heard to ask an architect, "What style do you call the Imperial Institute?" or "Who was the architect of that fine church of St. Augustine's, Kilburn, which I happened to see the other day?" and so on—questions that show how absolute an ignorance of the development of the architecture of the present day exists even in cultivated circles.

It is to this class, we imagine, that the author intends to appeal as the public mentioned in his title; but the circumstances of the origin of his book in lectures of the kind mentioned above, tells altogether against its usefulness in that respect. It contains a great deal of criticism that was sufficiently useful when directed to the students to whom the lectures were given, but which is out of place in a work addressed to a special class of the public outside.

Again, the author's position as editor of the *Builder* placed at his command a large supply of illustrations for these lectures from the plates of his own journal, which are here given in a much reduced, and consequently very poorly executed, form; but though the *Builder* retains the leading position amongst architectural papers, it cannot by any means be held to be a fully representative depository of the modern architecture even of England.

Very many of the best buildings never are illustrated at all, either because the architects do not care to publish, or else do not take the trouble to have elaborate drawings made solely for publication; while, on the other hand, there is a flood of second-rate work that is given to the world for obvious commercial reasons.

To rely upon the illustrated journals for a knowledge of modern work is as hopeless as the proceedings of an American critic, who in all good faith tried riding down the main streets of the metropolis on the top of an omnibus, in the expectation of forming an impression of the quality of modern architecture in London.

For a book with this title, the subjects illustrated are too incomplete for it to possess the scientific value that a comprehensive treatise would contain, and in the letterpress the same inadequacy prevails.

The best section is that on State and municipal architecture, the subject that seems to have the greatest interest for the author; but that on the highly important question of domestic work is only slightly treated, and that on church architecture is on lines which, we feel, would hardly be endorsed by those to whom the greatest progress in this branch, in modern times, has been due.

This is not the only section in which the tone of the work is unfortunate. The style in which it is written is hasty and journalistic, and we do not quite like the writer's method of making points by quoting what appears to have been said to him in private conversation, where views are apt to be expressed with a greater vivacity, not to say exaggeration, than the speaker would use in the more deliberate statement of writing.

The truth is, that there is no royal road or cheap handbook to a knowledge of modern architecture. The serious student must hunt up the buildings for himself, even if they are five miles from a railway station. The performances of a great architect are seldom known until his death, and perhaps not even then. The public have no knowledge of Nesfield, Devey, or Bentley, to take three names at random—none of whom, by the way, are mentioned in this book—except that, as regards the last, the writer seems to think that because the new Roman Catholic cathedral drawings have not been given to the *Builder*, that therefore "it is a design about which there is a great reluctance to give any definite information"; a very amusing remark in view of the fact that students interested in the matter have long ago bought copies of a publication in which the scale drawings and full particulars of this remarkable design have been given.

The book on perspective is one of those innumerable works that the modern craze for examination produces; it is designed to meet, as quoted on the title-page, the requirements of four examining bodies, and as the author is instructor to the Royal Naval cadets on the *Britannia*, he has the necessary teaching experience to make his work likely to be helpful to the unlucky souls condemned to these examinations. To the architect, for whom also the book is intended, perspective should present itself as an almost indispensable accomplishment, but one which it is also far more important to acquire through practice than theory. It is a rule that in perspective drawing, there are many ways of arriving at the desired result; and as a matter of fact, except in a few universal points, most draughtsmen have their own methods of reaching a given result. We never yet met a student who used the method given in Chapter xii. for making a sketch, but possibly it might be of service to a beginner. As specimens of drawings—a rather important, though neglected point—the illustrations leave something to be desired, and when architecture is given the design is also not the best selected. This, unfortunately however, is universal in many text-books. In Chapter xvi. the defects of perspective in photography are explained, and a useful method of correction is given, constituting a good feature of the work.

A diagram is also given of how to set a centrolinead, showing the increasing value attached to this useful instrument, which every student should be taught to handle.

The book is clearly arranged and well referenced, which is an important point for actual use, because whatever method of perspective setting-up the student uses, it is indispensable that he shou'd have it at his fingers' ends, so that he may not be hampered in devoting himself to an artistic result in his drawing; but, inasmuch as the memory is apt to be treacherous in such matters, facility of reference is an invaluable saving of time.

The volume on carpentry and joinery has also been written with the special object of preparing for examinations, and the present work refers to the first or preliminary course of the City and Guilds Institute, which is dealt with from a practical point of view; but a better title would be "mensuration, physics, plane and solid geometry, &c., as applied to carpentry, &c.," the bulk of the volume being taken up with these subjects. The book forms a good introduction to the subject, which we welcome as a method and an inducement for the British craftsman to study his craft in a more scientific manner than has been the case in the past. One or two points might be revised. Fig. 53 shows a pointed arch in stone which is scientifically wrong, as the meeting of the two arches should be a straight joint in order that each section may move independently without causing a fracture. Problem No. 90 could be described accurately instead of approximately by the "trammel" method, as indeed is explained in Problem 91. It is, perhaps, advisable to adhere only to exact methods for the workman, as he is liable to get muddled between two methods.

The exercises placed at the end of each chapter are well arranged, and should teach the workman to think for himself—a most important point.

Some misprints are, perhaps, inevitable where so many figures and letters are introduced, as 39° for 30° on p. 169. The chapter on isometric projection will be found very useful for explaining joints, &c., but the lettering to the diagrams is not as distinct as it might be, and could be improved by the author if a future edition is required. The chapters on setting out of doors and windows are well arranged, but the joints at the feet of principal rafter and tie-beam in Figs. 245, 246, 247 and 248, will not, it is hoped, be repeated in succeeding volumes. The chapters on the resolution of forces, mechanical contrivances, bending moments, &c., give a prominent place to the scientific part of the subject, a study which we can with confidence advise the craftsman to undertake. The chapter on the determination of stresses might be made somewhat clearer, having regard to the class of man for whom the book is intended, if the author would take the forces acting at any point always in the same order, and work round with the sun. Under "mechanical contrivances" no mention appears to be made of the screw, which is specially mentioned in the syllabus. We refer with regret to the fact that there is no index, which detracts materially from the value of a well-arranged book.

---

## A GERMAN POPULAR ASTRONOMY.

*Das Weltgebäude.—Eine gemeinverständliche Himmelskunde.* Von Dr. M. Wilhelm Meyer. Mit 287 Abbildungen im Text, 10 Karten, und 31 Tafeln, im Farbendruck, Heliograviüre und Holzschnitt. (Leipzig und Wien: Bibliographisches Institut, 1898.)

IN a very handsome volume, well written, well printed, and well illustrated, Dr. Meyer has given us the main results of astronomical observation. We may congratulate both the author and his readers on the selection of the facts that has been made, and submitted to consideration. The arrangement of the material has evidently been the subject of much care and thought; but we cannot say that the final result commends itself entirely to our judgment. In a short preface, Dr. Meyer has intimated the general principles by which he has been guided in preparing his work. He has wished the reader to appreciate the grounds on which certain truths have been received, and not simply accept the assertions as an outcome of authoritative teaching. He admits that without mathematical symbols and analysis it may be difficult to offer direct proof in support of many statements; but by translating the results of mathematical deductions into the language of ordinary life, he thinks it possible to find an efficient substitute. It is not without a feeling of apprehension that one reads of threats of this kind. Efforts to reproduce mathematical results without the use of the necessary machinery generally prove wearisome to the mathematician, and unintelligible to the ordinary reader. But Dr. Meyer has not taken the matter too seriously, and even in his chapter on the Newtonian system avoids the perils of adhering too closely to his own principles.

The author has divided his book into two parts. The first is descriptive, and in this section his endeavour is to describe the whole universe as it may be seen with instruments particularly designed for special ends. The causes for these appearances, or the theories by which they may be explained, are reserved for the second part. Whether such an arrangement is satisfactory can only be decided by the student. To any one who approaches the book with a fair amount of astronomical knowledge, it appears cut in halves, without sufficient reason. As it is impossible within a limited space to describe each section separately, the author's method of treatment may be illustrated by referring to the description of the moon, given in the first section, immediately after describing, not at too great length, but adequately, the telescope and spectroscope and the processes of photography and photometry. We have first of all an account of the phases, for the detection of which no telescope is necessary, and for whose correct explanation but little ingenuity is required. The instrumental examination of the moon begins with the application of the spectroscope to the light, and the obvious deductions that follow its use are necessarily given. Having discussed the absence of an atmosphere, the effect of the sun's heat, &c., we get to the telescope and trace historically the cartography of the moon from Hevel to Schmidt. Finally, and also following chronological order, we reach the age of photography and the delineations of Weinek from the Lick negatives, many of which are reproduced. Particularly good and interesting are the comparisons instituted between portions of the lunar surface and certain districts on the earth, not by any means with the view of suggesting that the configurations have been produced by similar processes in each case, but as a convenient way of illustrating points of resemblance or emphasising points of difference. The Island of Corsica, the Colorado Cañon, the Yosemite Valley are all in turn discussed and made to illustrate some generic feature on the lunar surface. Altogether it is the best description of the moon we have read; and it is only when we come to remember what is omitted, that we have any sense of dissatisfaction. For instance, we find nothing about the distance of the moon, though the diameter is given. This is surely a departure from the rule to be purely descriptive, though the description gains immensely by it, since it enables comparisons to be drawn between similar features on the earth. Moreover, while the distance remains undetermined, the diameter must be taken on authority; and this is opposed to the fundamental canon of the preface. The geometry of eclipses has to be relegated to the second part, similarly with other phenomena depending upon the mass of the moon, such as the action of the tides or the effects of precession and nutation. The advantage of the arrangement does not seem evident, nor does it entirely fulfil the purpose for which it was designed, although each part is admirable in itself, but wanting in completeness and connection. The method pursued with the moon is continued throughout the solar system, though of course there is not always the same necessity to return to omitted portions. From the members of the solar system we pass to comets and meteors, and finally to the universe of the fixed stars. It goes without saying that these chapters are not only correct, but offer us the latest information drawn, as they are, from experts in their several branches of investigation. For the author, distrustful of his own knowledge, and remembering that the fact of to-day is liable to be displaced by the newer discovery of to-morrow, prudently placed his manuscript for correction in the hands of various authorities. Thus, Schiaparelli either describes or confirms the description of Mars, and Dr. Scheiner, of Potsdam, is responsible for the accuracy of the chapters on spectrum analysis. Dr. Ginzel, who has written so largely on ancient chronology, is willing to assist here in the discussion of eclipses, while Dr.